MassHealth SCO Program Evaluation
Nursing Facility Entry Rate in
CY 2004-2005 Enrollment Cohorts

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Overview

For many years, the MassHealth Office of Long Term Care has contracted with JEN Associates, Inc. (JAI) of Cambridge to provide analytical and statistical consulting support for the MassHealth Senior Care Options (SCO) program. Specifically, JAI has linked the administrative data for Medicare and Medicaid, and has developed and provided critical descriptive and financial information needed to structure and implement the SCO model

SCO is an integrated Medicare and Medicaid managed care program that has been offered to elderly Medicaid eligible beneficiaries since 2004. Massachusetts Medicaid and the federal Centers for Medicare & Medicaid (CMS) jointly contract with qualified managed care plans (SCOs) to provide a complete benefit package that includes the full range of Medicaid and Medicare services for enrollees.

The SCO plans are open to elderly at all levels of disability. The integration of acute and long term care benefits and a Medicaid capitation rate that is responsive to changing levels of frailty make SCO plans especially well suited for providing flexible and extended community care to enrollees. A capitation structure that is responsive to beneficiary health status independent of the setting of care is a significant component in the SCO design. The intended result of this component of the program design is to provide enhanced financing for community care, and ultimately reduce long term nursing facility stays. While frail elderly with minimal to moderate disabilities will receive sufficient services to be able to remain in the community, only the frailest elderly of the SCO population will require nursing facility care. In other words, the level of impairment in SCO enrollees entering the nursing facility population will be higher than in non-SCO populations. Also, the impairment level of the community care population will rise as frail elderly are diverted from nursing facility entry. Consequently, the state asked JAI to compare SCO populations to other like populations (i.e. matched cohorts) for outcome measures related to reduced rates of nursing facility entry and changes in the frailty level in the SCO new-to-nursing-facility and community care populations.

Study Methods

JAI based its evaluation methods on a comparison between Medicaid beneficiaries who enroll in a SCO plan and a matched cohort of Massachusetts Medicaid enrollees who remain under fee-for-service Medicaid and Medicare benefits. A propensity-matched case/control cohort design statistically adjusts for differences between the case and comparison population both in the selection of a comparable control population and in the multivariate effect measurement analyses. The study population consists of elderly populations with concurrent eligibility for Medicare and Medicaid benefits at the time of SCO entry. Analysis is based on patterns of nursing facility utilization subsequent to the SCO enrollment date. The controls are analyzed on utilization patterns following a date matched to the cases' plan enrollment dates (the control's index date). The differential in Nursing Facility use measured in the follow-up period among the cases and controls is the basis for the program's effect estimate.

Data Sources

The baseline data for both the case and comparison populations was derived from Medicare and Medicaid administrative data. The data included program enrollment records with beneficiary demographics and health services claims data with detailed information on pre-enrollment patterns of procedures, diagnoses and episodes of acute hospital and long term care utilization. In the post-enrollment period, health services claims data is no longer available since the SCO plans are paid on a monthly capitated basis. SCO capitation payments are related to the assessed need of the beneficiary. In order to support a time varying capitation rate for a beneficiary, the monthly enrollment records include information on both nursing facility status and need for community long term care services. Health services utilization data in the post-index date period is available for the comparison population. The current analyses required that the original study data be updated with more recent Medicaid and Medicare enrollment and claim records covering the entire CY 2004-2006 period. The result of the update was small increases in the identification of the CY 2004 SCO study population and the total dually eligible population due to the inclusion of newly available eligibility status information. The changes did not affect the validity of the previous analyses but do lead to small differences in the descriptive statistics.

To implement a fair comparison between outcomes in the SCO enrollees and the comparison population a data source should be employed that provides equal information for the complete study population. The CMS Nursing Home Minimum Data Set (MDS) contains records of all stays in certified nursing facilities. The records include dates of stay, morbidity flags, activity of daily living assessments and other supporting data. Similarly the CMS Outcome and Assessment Information Set (OASIS) database includes records of utilization and assessment status for beneficiaries using licensed home health agencies, regardless of SCO enrollment. In summary the pre-enrollment period for study cases and controls can be profiled in depth using Medicaid and Medicare claims and enrollment data and the post enrollment period can be analyzed using SCO and Medicaid/Medicare enrollment data and the CMS MDS and OASIS sources.

Table 1-Available Data Sources for SCO Enrollees and Comparison Population

Data Sources	SCO Enrollees	Control Population
SCO Enrollment Records	Yes	N/A
SCO Assessment Records	Yes	N/A
MassHealth SCO Enrollee Rate Payment File	Yes	N/A
CMS Medicare Beneficiary Denominator	Yes	Yes
OASIS	Yes	Yes
MDS (NF/Certified Only)	Yes	Yes
FFS Claims (MCR MCD)	Pre-Enrollment	Yes

Elderly SCO Enrollee and All Medicaid Elderly Population Profiles

The SCO program is designed to provide integrated care for beneficiaries regardless of setting of care and frailty status. The program is expected to enroll beneficiaries that are community-dwelling and relatively healthy all the way through permanent nursing facility residents. The program is voluntary and actual enrollment patterns will rely on a

number of factors. In order to be able to fairly construct a control population, the key characteristics of SCO enrollees and other dually eligible Medicaid beneficiaries must be understood. The tables below contain specific measures of comparison between CY 2004/2005 SCO enrollees and all Medicaid dually eligible elderly. In order to profile pre-enrollee characteristics the descriptive tables include only Medicaid recipients with dual eligibility in the enrollment year and with a history of fee-for-service dual eligibility in the prior year. As a result of this restriction approximately 5% of SCO enrollees are not included in the descriptive tables.

Tables 2-5 provide demographic, long term care status and morbidity statistics for the Medicaid beneficiaries who enrolled in a SCO plan as well as the total Massachusetts elderly dual eligible beneficiaries. The data on pre-enrollment utilization, LTC status and diseases is from the prior year's claims and enrollment records.

Demographics

The dually eligible elderly are a heterogeneous population. The key beneficiary groups are low income seniors who are categorically needy for Medicaid, and other seniors who qualify as medically needy for Medicaid once they become very frail and require nursing facility level of care.

Table 2 SCO and All Dually Eligible Medicaid Elderly Demographic Profile

		CY 2004 SCO New Cases	All CY 2004 MA Elderly Duals	CY 2005 SCO New Cases	All CY 2005 MA Elderly Duals
		N=644[1]	N=97,030	N=2,145	N=96,956
Gender	Male	27%	28%	31%	28%
	Female	73%	72%	69%	72%
Age Categories	Age <=74	54%	40%	56%	41%
	Age 75-84	34%	36%	34%	35%
	Age 85+	13%	24%	10%	24%

On average, SCO enrollees are younger than the total Medicaid elderly population, with fewer "very old" elderly enrollees and more "younger" elderly.

Long Term Care (LTC) Utilization Status

The highest frequency age group for long stay nursing facility enrollees is over age 80. The younger age of SCO enrollees suggests that fewer nursing facility residents are in the program than in the overall Medicaid elderly population. In Table 3, the SCO and Medicaid elderly populations are categorized according to their LTC status at the end of the year prior to SCO enrollment. The categories are specifically designed for persistent users of long term care services with episodes that are greater than 3 months in duration.

[1] The original SCO profile of the CY 2004 enrollee population was updated with more recent Medicaid eligibility and Medicare enrollment data. The result of the update was a small increase in the identification of the SCO study population and the total dually eligible population. The change in the study population led to the identification of 9 new SCO enrollees in CY 2004.

The episode algorithm used for the stratification does allow for off-utilization periods related to inpatient hospital care[2].

Table 3 Pre-SCO LTC Status Profile in December of the Prior Year

		CY 2004 SCO New Cases	All CY 2004 MA Elderly Duals	CY 2005 SCO New Cases	All CY 2005 MA Elderly Duals
LTC Setting	Nursing Facility Residents	6%	28%	4%	27%
	Community LTC Users	21%	12%	13%	12%
	Community Well	73%	60%	83%	61%

On average, SCO enrollees were less likely to be long term nursing facility residents than the total elderly dual eligible population and more likely to have a history of community care utilization. Community care includes Medicaid personal care, adult foster care, adult day health services and Medicare home health care. The community care status of CY 2005 enrollees is much reduced in comparison to the CY 2004 enrollees.

Chronic Disease Prevalence

The SCO program is designed for the integration of Medicaid financing of community focused care with Medicare financing for medical services. The integration of benefits is attractive to beneficiaries with chronic disease and disability. Table 4 includes prevalence statistics in the pre-SCO enrollment period for selected chronic diseases that have a significant impact on the elderly.

Table 4 Pre-SCO Chronic Disease Profile in Pre-Enrollment Year

		CY 2004 SCO Cases	All 2004 MA Elderly Duals	CY 2005 SCO Cases	All 2005 MA Elderly Duals
Pre SCO Chronic Disease Indicators	Diabetes	49%	36%	47%	37%
	CHD[3]	40%	44%	34%	44%
	CVD	16%	22%	14%	22%
	CRD	28%	30%	31%	30%
	Arthritis	36%	31%	32%	30%
	CHF	20%	24%	15%	24%
Chronic Disease Count	Avg.	1.88	1.72	1.72	1.71

The SCO population does have a substantially higher rate of diabetes. However the SCO prevalence rate for the conditions in Table 4 is not remarkably higher than the rate for the overall elderly dually eligible.

[2]The original SCO analysis used a simple hierarchical utilization marker for pre-SCO LTC care status. The described episode based assignment of LTC status provides a more stringent population classification than in the previous report.

[3] CHD=Chronic Heart Disease, CVD= Cerebrovascular Disease, CRD= Chronic Respiratory Disease, CHF=Heart Failure

Utilization Rates

The SCO program should provide easier access to care with improved coordination between supportive care providers and physicians. Limitations in access or difficulties in cross program benefit management may motivate SCO enrollment. Table 5 presents specific measures of utilization in the pre-SCO enrollment period.

Table 5 Profile in Pre-Enrollment Year of Key Ambulatory and Hospital Use

Per Beneficiary Use in Year	CY 2004 SCO Cases	All 2004 MA Elderly Duals	CY 2005 SCO Cases	All 2005 MA Elderly Duals
Hospitalization Days	2.37	3.02	2.00	3.10
Outpatient Specialist Visits	6.58	5.16	5.68	5.59
Outpatient General Practitioner Visits	3.95	4.76	5.04	5.06
Outpatient ER Visits in Year	0.60	0.41	0.44	0.43

The main trend is that the differences between CY 2004 SCO enrollees and the total dually eligible elderly population are not sustained in the CY 2005 enrollees. The elevated ER utilization, lower hospital days and propensity to use specialist care is reduced. The CY 2005 SCO enrollee hospital and outpatient services is in line with the total dually eligible elderly in the baseline year.

Comparison Population

The information in Tables 2-5 indicate a number of significant differences exist between the SCO population and the general Medicaid elderly population. The analytic challenge is to adjust for these differences such that a fair comparison can be made between the SCO enrollees and a like control population. JAI considered multivariate regression models to implement complex statistical adjustments to account for population differences. However, JAI chose a more sophisticated approach employing a two stage process: 1) selecting controls that are matched to cases using direct matching and statistical matching; 2) measuring effects using a multivariate regression model that further adjusts for the remaining differences in population characteristics. Tables 2-5 suggest the specifications for the control selection "propensity" model. The control selection process identifies a population that has the same balance of characteristics as observed in SCO enrollees. Population demographics, history of chronic disease, history of utilization of acute and long term care services, Medicaid and Medicare status are taken into account in the selection process. A combination of direct matching and propensity matching are used to select controls that are similar to the case population. Table 6 includes a complete list of the factors used for control selection.

Table 6 Control Selection Factors

Study Member Characteristic	Match Type
Gender Male Female	Direct Match
Index Age Categories Age <65 Age 65-74 Age 75-84 Age 85+	Direct Match

Study Member Characteristic	Match Type
Race/Ethnicity White Black Hispanic Other/Unknown Race	Direct Match
County	Direct Match
SCO Enrollment Month	Direct Match
MCR Status in Index Month Part A Only Part B Only Parts A & B Part A Only/State Paid Premium Part B Only/State Paid Premium Parts A & B/State Paid Premium	Direct Match
MA Risk Status Month prior to Index Community/Other Community LTC Nursing/Institutional LTC	Direct Match
MCD NF Case Mix Status Month prior to Index	Direct Match
Alzheimer's/CMI Indication in Month prior to Index	Direct Match
Base Period (1-3 months pre-index) Medical Utilization Inpatient Utilization Home Health Utilization Adult Foster Care Day Habilitation Utilization MCD Waiver Utilization	Propensity
Base Period (1-3 months pre-index) LTC Setting Hierarchy Long Stay Nursing Facility Post Acute Care SNF Community	Propensity
FFS Dual Eligible in 2003	Direct Match
Count of CY 2003 JAI Frailty/Impairment Groups 0 1-3 4-6 7+	Propensity
CY2000 Chronic Disease Indicators Diabetes CHD CVD CRD Arthritis CHF	Propensity

The control selection specification aimed for 3 controls to be selected for each case. The result of the control selection process was the selection of 1,898 CY 2004 controls and 6,232 CY 2005 controls. In each cohort a small number of cases could not be matched to a full set of 3 controls. With the selection of a comparison population, the program effectiveness analysis proceeds through the analysis of differential outcomes among SCO enrollees and controls in the post-enrollment/index date periods.

Outcome Measures

The impact of the SCO model is based on the dynamic nature of the Medicaid capitation rate and the requirement to perform regular assessments. There is a financial incentive to recognize a high risk case and to manage both the Medicaid and Medicare benefits to reduce adverse events. One of the most costly events to Medicaid is long term entry into a nursing facility. By increasing access to community long term care in a timely way, it is hypothesized that nursing facility entry will be reduced. There are three major types of nursing facility episodes: 1) extended rehabilitation care following a hospitalization; 2) end-of-life care; 3) long term placement in an institution. The first NF modality is perhaps a natural outcome of an acute care episode. The second model depends on the availability and quality of end-of-life community care. The third nursing facility modality, long term placement, is the most costly to the Medicaid program and perhaps the most difficult to reduce since it is attributable in many cases to a history of functional decline.

The outcome measure of interest is measured using multivariate proportional hazards model measuring the SCO program's effect on average time to a NF entry. A supporting analysis examines the characteristics of SCO members who do enter nursing care for indications of higher risk. The analyses are restricted to SCO enrollees in 2004 and 2005 and examine outcomes through the end of CY 2006. [As more data becomes available, the analyses will be extended to later years].

CY 2004 SCO Enrollees Key Findings

SCO enrollment began in March 2004. However, the median enrollment point in 2004 was September. Between SCO entry and the end of the study period a total of 52 SCO enrollees and 213 controls used a nursing facility. Most nursing facilities include both Medicare short term SNF and Medicaid long term care services. Both financing streams are included since SNF utilization is frequently a prelude to entry into Medicaid financed nursing facility care. Table 7 provides descriptive detail on the number of study members entering a nursing facility utilization episode in the follow-up period as stratified by the type of episode. The first episode type, extended rehabilitation, is primarily driven by Medicare SNF stays. Other episode types are related to episodes that go beyond the Medicare SNF benefit and are primarily Medicaid financed. The episodes are derived from a mixture of NH MDS admission and assessment records, SCO rate cell in the month, and Medicare/Medicaid fee-for-service records for nursing facility use. Virtually all the episodes are detectable in the MDS data source, however supporting information, including a more accurate admission date, was obtained from the other sources. The analysis of elapsed time to entry was based on a count of whole months from the index date to the month of the nursing facility utilization episode start.

Table 7 Nursing Facility Entry Rate by Type

NF Entry and Type of Stay	SCO Enrollees		Control Population	
Nursing Facility Entry Person Count	52	8.7%	213	12.0%
Average months to NF Episode	7.27		6.16	
Average episode months in NF	2.65		3.94	
Discharge from Nursing Facility Count	29	56.0%	111	52.0%
Type of NF Stay				
Rehab (<4 months)	22	42.3%	96	45.1%
End of Life (<6 months w/ Death)	9	17.3%	25	11.7%
Long Term Residency (>=4 months)	8	15.4%	64	30.0%
Undetermined (Limited Follow-up)	13	25.0%	28	13.1%

The descriptive statistics demonstrate that SCO enrollees in comparison to the control population enter nursing facilities at a lower rate. In addition the time to first nursing utilization is greater and the time spent in a nursing facility episode is less than in the control population. For SCO enrollees that do use a nursing facility there is substantially lower frequency of long term residency. The one exception to the pattern is a higher tendency for nursing facility episodes for SCO end-of-life care. Due to the longer time to first utilization of a nursing facility by SCO enrollees, the number of users without sufficient follow-up time for a classification is elevated. For complete classification, four-six months of follow-up data is required to classify a nursing facility utilization episode.

A multivariate proportional hazards model was employed to measure the effect of SCO enrollment on first use of nursing facilities. The specification of the model followed a step-wise selection to identify significant effect correlates. The results of the model are presented in Table 8.

Table 8 Proportional Hazards Model for Nursing Facility Entry

Analysis of Maximum Likelihood Estimates							
Variable	**Parameter Estimate**	**Std. Error**	**Chi Sq**	**Pr > Chi Sq**	**Hazard Ratio**	**95% Confidence Limits**	
Inpatient Utilization 1-3 Months Pre-index	0.62210	0.19333	10.35	0.0013	1.86	1.28	2.72
Home Health Utilization 1-3 Months Pre-index	0.61237	0.14258	18.45	<.0001	1.85	1.40	2.44
Assisted Living Utilization 1-3 Months Pre-index	1.64766	0.20843	62.49	<.0001	5.20	3.45	7.82
MCD Waiver Utilization 1-3 Months Pre-index	0.61855	0.21108	8.59	0.0034	1.86	1.23	2.81
NF Utilization 1-3 Months Pre-index	1.73018	0.27078	40.83	<.0001	5.64	3.32	9.59
SNF Utilization 1-3 Months Pre-index	1.18914	0.43427	7.50	0.0062	3.28	1.40	7.69
FFS-Dual Eligible from July 2003	-0.92930	0.23555	15.57	<.0001	0.40	0.25	0.63
2003 Eligibility/JAI Impairment Count 4-6	0.34968	0.15804	4.90	0.0269	1.42	1.04	1.93
2003 Eligibility/JAI Impairment Count 7+	0.71455	0.20649	11.97	0.0005	2.04	1.36	3.06
2003 Eligibility/COPD	0.41219	0.13650	9.12	0.0025	1.51	1.16	1.97
SCO Enrollment	**-0.54218**	**0.16308**	**11.05**	**0.0009**	**0.58**	**0.42**	**0.80**

The adjusted results demonstrate a strong and significant protective effect of the SCO program against nursing facility entry after adjusting for selected pre-index measures of patient risk. The effect measure is a measure of time to entry during the period from SCO enrollment to the end of the data. The measure is a composite of nursing facility utilization deferral and diversion. The Hazard Ratio can be directly interpreted as a 42% reduction in nursing facility utilization risk.

The second outcome indicator is the profile of functional ADL scores for the SCO and control population that start a nursing facility use episode. Not all MDS records include ADL information and only those episodes with the information and with MDS dates that correspond to the NF entry are included in the analysis. Table 9 is a univariate tabulation of scores for each major ADL category and a summary record across ADLs. The summary ADLs are computed based on all functional scores, the higher the score the greater the level of required assistance, the final tabulation in the table is based on a selection of ADLs.

Table 9 ADL Levels at NF Episode Initiation

TYPE OF NF STAY = ALL

		SCO Matched Cases N=52					Matched Controls N=213				
Individual and Cumulative MDS ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	13	25.0%				25	11.7%			
Asmtf	MDS Assessment = Yes	39	75.0%				188	88.3%			
ADLs											
g1av	BED*	39	2.18	0	3	3	188	2.08	1	2	3
g1bv	TRANS*	39	2.28	1	3	3	188	2.46	2	3	3
g1cv	WLK RM*	39	3.64	2	3	8	187	3.37	2	2	3
g1dv	WLK CORR*	39	4.49	2	3	8	187	3.65	2	2	8
g1ev	LOC UNIT	39	2.87	2	3	4	187	2.74	2	2	4
g1fv	LOC OFFU	39	3.28	2	3	4	187	3.93	2	3	4
g1gv	DRESS*	39	2.77	2	3	4	187	2.58	2	3	3
g1hv	EAT*	39	0.77	0	0	1	188	0.69	0	0	1
g1iv	TOLIET*	39	2.51	2	3	4	188	2.54	2	3	3
g1jv	HYGIENE*	39	2.62	2	3	3	187	2.41	2	2	3
g2v	BATH	39	3.05	3	3	4	187	2.86	3	3	3
ADLscore	Sum Above ADLs	39	30.46	19	30	42	187	29.30	21	28	40
ADLscore8	Sum of Indicated (*) ADLs	39	21.36	13	21	32	187	19.93	13	18	28

The unadjusted data in Table 9 suggests that SCO enrollees entering a nursing facility episode are assessed with more functional impairment than the controls. The differential is not large, but as seen in Table 10 it is higher for the subset of episodes that are classified as long stay. The results are intriguing since the underlying hypothesis predicts that SCO community care will lead to decreased NF episodes, and the SCO enrollees who do enter a nursing facility will represent a more frail population. The adjusted analysis of nursing facility episode initiation shows a decrease from the number of expected nursing facility entries as well as decrease in the length of stay. In addition, the

unadjusted first year results of frailty status of SCO and controls suggest that the hypothesis of greater frailty among those SCO cases that do enter facility care is true.

Table 10 ADL Levels at Long Stay NF Episode Initiation

TYPE OF NF STAY = LTC (>=4 MONTHS)											
		SCO Matched Cases N = 10					Matched Controls N = 78				
Individual and Cumulative ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	0	0.0%				3	3.8%			
Asmtf	MDS Assessment = Yes	10	100.0%				75	96.2%			
ADLs											
g1av	BED*	10	2.10	0	2.5	3	75	1.93	0	2	3
g1bv	TRANS*	10	2.20	2	2.5	3	75	2.52	2	3	3
g1cv	WLK RM*	10	4.20	2	3	8	75	3.33	2	3	3
g1dv	WLK CORR*	10	5.20	2	8	8	75	3.52	2	2	8
g1ev	LOC UNIT	10	2.70	2	3	4	75	2.75	2	3	4
g1fv	LOC OFFU	10	3.50	2	3.5	4	75	3.75	2	3	4
g1gv	DRESS*	10	3.00	2	3	4	75	2.61	2	3	3
g1hv	EAT*	10	1.10	0	0.5	1	75	0.57	0	0	1
g1iv	TOLIET*	10	2.70	1	3	4	75	2.67	2	3	3
g1jv	HYGIENE*	10	2.80	2	3	4	75	2.60	2	3	3
g2v	BATH	10	3.30	3	3	4	75	3.03	3	3	4
ADL score	Sum Above ADLs	10	32.80	19	37	45	75	29.28	21	30	40
ADL score8	Sum of Indicated (*) ADLs	10	23.00	13	27	33	75	19.89	13	19	27

CY 2004 SCO Enrollees Followed Through 2006 Key Findings

An analysis of the CY 2004 SCO enrollees was extended through CY 2006. In the second year of SCO enrollment the surviving population was subject to the same measures described in the previous section. In CY 2006 an additional 83 SCO enrollees and 360 controls entered a nursing facility. In Table 11 the difference in stay types is profiled. As in the year 1 one analysis the SCO enrollees are spending more time in the community prior to a nursing facility episode and stay for a shorter period of time. The SCO enrollees are more likely to use a nursing facility for extended rehabilitation and end of life care and less likely to stay in a nursing facility beyond 4 months.

Table 11 Nursing Facility Entry Rate by Type

NF Entry and Type of Stay	SCO Enrollees		Control Population	
Entry Person Count	83	13.8%	309	17.4%
Average months to NF Episode	12.18		10.82	
Average episode months in NF	2.81		4.99	
Discharge from Nursing Facility Count	52	62.7%	175	56.6%
Type of NF Stay				
Rehab (<4 months)	48	57.8%	152	49.2%
End of Life (<6 months w/ Death)	17	20.5%	44	14.2%
Long Term Residency (>=4 months)	11	13.3%	87	28.2%
Undetermined (Limited Follow-up)	7	8.4%	26	8.4%

A proportional hazards analysis shows a reduced risk of nursing facility entry over the year 2 follow-up period. The Table 12 report of the hazard ratio's value and significance continues to demonstrate a protective effect associated with SCO enrollment in nursing facility diversion/deferment.

Table 12 Proportional Hazards Model for Nursing Facility Entry

Analysis of Maximum Likelihood Estimates							
Variable	**Parameter Estimate**	**Std. Error**	**Chi Sq**	**Pr > Chi Sq**	**Hazard Ratio**	**95% Confidence Limits**	
Inpatient Utilization 1-3 Months Pre-index	0.50801	0.16915	9.02	0.0027	1.66	1.19	2.32
Home Health Utilization 1-3 Months Pre-index	0.58371	0.11613	25.27	<.0001	1.79	1.43	2.25
Assisted Living Utilization 1-3 Months Pre-index	1.60737	0.17940	80.28	<.0001	4.99	3.51	7.09
MCD Waiver Utilization 1-3 Months Pre-index	0.56609	0.18150	9.73	0.0018	1.76	1.23	2.51
NF Utilization 1-3 Months Pre-index	1.55906	0.25056	38.72	<.0001	4.75	2.91	7.77
SNF Utilization 1-3 Months Pre-index	0.95766	0.42690	5.03	0.0249	2.61	1.13	6.02
FFS-Dual Eligible from July 2003	-0.67950	0.20738	10.74	0.0011	0.51	0.34	0.76
2003 Eligibility/JAI Impairment Count 4-6	0.36872	0.12671	8.47	0.0036	1.45	1.13	1.85
2003 Eligibility/JAI Impairment Count 7+	0.74735	0.16954	19.43	<.0001	2.11	1.51	2.94
2003 Eligibility/COPD	0.41019	0.11092	13.68	0.0002	1.51	1.21	1.87
SCO Enrollee	**-0.37960**	**0.12975**	**8.56**	**0.0034**	**0.68**	**0.53**	**0.88**

In Table 13 ADL scores from the MCBS are reported for SCO enrollees and controls who enter a nursing facility for all stay types. Overall the ADL scores are not substantially different.

Table 13 ADL Levels at NF Episode Initiation

TYPE OF NF STAY = ALL											
		SCO Matched Cases N=83					Matched Controls N=309				
Individual and Cumulative MDS ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	18	21.7%				31	10.0%			
Asmtf	MDS Assessment = Yes	65	78.3%				278	90.0%			
ADLs											
g1av	BED*	65	2.00	0	3	3	278	2.31	2	3	3
g1bv	TRANS*	65	2.45	2	3	3	278	2.66	2	3	3
g1cv	WLK RM*	65	3.48	2	2	3	277	3.56	2	3	3
g1dv	WLK CORR*	65	4.35	2	3	8	277	3.91	2	3	8
g1ev	LOC UNIT	65	2.98	2	3	4	277	2.89	2	3	4
g1fv	LOC OFFU	65	3.58	3	3	4	277	3.94	2	3	4
g1gv	DRESS*	65	2.74	2	3	3	277	2.70	2	3	3
g1hv	EAT*	65	0.71	0	0	1	278	0.71	0	0	1
g1iv	TOLIET*	65	2.58	2	3	3	278	2.68	2	3	3
g1jv	HYGIENE*	65	2.62	2	3	3	277	2.53	2	3	3
g2v	BATH	65	3.06	3	3	3	277	2.96	3	3	3
ADL score	Sum Above ADLs	65	30.55	21	30	39	277	30.84	23	30	40
ADL score8	Sum of Indicated (*) ADLs	65	21.17	13	21	29	277	21.25	15	20	29

In Table 14 the focus is on ADL scores for long stay episodes.

Table 14 ADL Levels at Long Stay NF Episode Initiation

TYPE OF NF STAY = LTC (>=4 MONTHS)											
		SCO Matched Cases N = 11					Matched Controls N = 87				
Individual and Cumulative ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	0	0.0%				0	0.0%			
Asmtf	MDS Assessment = Yes	11	100.0%				87	100.0%			
ADLs											
g1av	BED*	11	2.09	0	3	3	87	2.13	1	3	3
g1bv	TRANS*	11	2.64	0	3	3	87	2.69	2	3	3
g1cv	WLK RM*	11	4.55	1	3	8	87	3.45	2	3	3
g1dv	WLK CORR*	11	5.45	1	8	8	87	3.79	2	3	8
g1ev	LOC UNIT	11	3.45	3	4	4	87	2.89	2	3	4
g1fv	LOC OFFU	11	4.09	3	4	4	87	3.82	2	3	4
g1gv	DRESS*	11	3.00	2	3	4	87	2.70	2	3	3
g1hv	EAT*	11	1.18	0	0	3	87	0.69	0	0	1
g1iv	TOLIET*	11	2.82	1	4	4	87	2.75	2	3	3
g1jv	HYGIENE*	11	2.91	2	3	4	87	2.72	2	3	3
g2v	BATH	11	3.45	3	3	4	87	3.14	3	3	4
ADL score	Sum Above ADLs	11	35.64	17	39	51	87	30.76	23	30	41
ADL score8	Sum of Indicated (*) ADLs	11	25.09	8	29	38	87	21.10	15	20	29

The ADL score differential between SCO enrollees and controls is evident for the long stay episodes. The average score for SCO enrollees is 25.09 versus 21.10 for the

controls. The implication of the stay typology profile, the hazards result and the ADL score levels is that SCO enrollees are less likely to enter a nursing facility in year 2 and for long stay episodes are frailer than the control population.

CY 2005 SCO Enrollees Followed Through 2006 Key Findings

The analysis of the first year of SCO enrollment impact on nursing facility use was repeated using the CY 2005 SCO new enrollee population. As reported in earlier tables the CY 2005 population differs in several respects from CY 2004 enrollees. The population is younger and less reliant on community care services and demonstrates lower levels of morbidity. In many respects the CY 2005 population is more similar to the overall Massachusetts dual eligible elderly population.

Table 16 reports nursing facility stay type. The CY 2005 SCO enrollee population nursing facility stay statistics continue to show that the SCO population is overall less likely to enter a nursing facility 8.4% versus 12.0%. For those that do enter, SCO enrollees are more likely to use nursing facility care for extended rehabilitation and less likely to become long stay residents. The rate of stays associated with end of life care is greatly reduced in comparison to the CY 2004 SCO enrollee analysis. In total the central observation that SCO enrollees are much less likely than the controls to become long term residents in a nursing facility is maintained. For SCO enrollees who use nursing facility care only 11.6% have stays of greater than 4 months as opposed to 27.1% of the control stays.

Table 16 Nursing Facility Entry Rate by Type

NF Entry and Type of Stay	SCO Enrollees		Control Population	
Nursing Facility Entry Person Count	173	8.4%	723	12.0%
Average months to NF Episode	8.03		7.46	
Average episode months in NF	2.40		3.95	
Discharge from Nursing Facility Count	126	72.8%	389	53.8%
Type of NF Stay				
Rehab (<4 months)	113	65.3%	337	46.6%
End of Life (<6 months w/ Death)	14	8.1%	95	13.1%
Long Term Residency (>=4 months)	20	11.6%	196	27.1%
Undetermined (Limited Follow-up)	26	15.0%	95	13.1%

In Table 17 the results from a proportional hazards model for nursing facility entry is reported. The hazards ratio for SCO enrollment continues to show a strong protective effect against nursing facility entry. The strength and significance of the effect is substantially similar to the findings reported for nursing facility diversion/deferment in the CY 2004 SCO enrollee population.

Table 17 Proportional Hazards Model for Nursing Facility Entry

Analysis of Maximum Likelihood Estimates							
Variable	**Parameter Estimate**	**Std. Error**	**Chi Sq**	**Pr > Chi Sq**	**Hazard Ratio**	**95% Confidence Limits**	
Inpatient Utilization 1-3 Months Pre-index	0.47424	0.09794	23.45	<.0001	1.61	1.33	1.95
Home Health Utilization 1-3 Months Pre-index	0.37300	0.08790	18.01	<.0001	1.45	1.22	1.73
MCD Waiver Utilization 1-3 Months Pre-index	0.59603	0.10118	34.70	<.0001	1.82	1.49	2.21
NF Utilization 1-3 Months Pre-index	2.21164	0.20695	114.21	<.0001	9.13	6.09	13.70
SNF Utilization 1-3 Months Pre-index	0.72829	0.20778	12.29	0.0005	2.07	1.38	3.11
2004 Eligibility/JAI Impairment Count 4-6	0.41295	0.08134	25.77	<.0001	1.51	1.29	1.77
2004 Eligibility/JAI Impairment Count 7+	0.79352	0.11796	45.26	<.0001	2.21	1.76	2.79
2004 Eligibility/CVD	0.21808	0.09084	5.76	0.0164	1.24	1.04	1.49
2004 Eligibility/Arthritis	0.21364	0.07023	9.25	0.0023	1.24	1.08	1.42
2004 Eligibility/CHF	0.32153	0.08515	14.26	0.0002	1.38	1.17	1.63
SCO Enrollee	**-0.40352**	**0.08539**	**22.33**	**<.0001**	**0.67**	**0.57**	**0.79**

In total CY 2005 SCO enrollment is associated with a one third drop in the risk of nursing facility entry from the enrollment date through CY 2006.

In Tables 18-19 measurements of ADL score are reported for SCO enrollees and the controls who enter a nursing facility for all stays and for long stays. As in the previous analyses the ADL scores are used to represent the frailty of the nursing facility users.

Table 18 ADL Levels at NF Episode Initiation

TYPE OF NF STAY = ALL											
		SCO Matched Cases N = 173					Matched Controls N = 723				
Individual and Cumulative MDS ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	48	27.7%				29	4.0%			
Asmtf	MDS Assessment = Yes	125	72.3%				694	96.0%			
ADLs											
g1av	BED*	125	2.02	0	2	3	694	2.34	2	3	3
g1bv	TRANS*	125	2.45	2	3	3	694	2.58	2	3	3
g1cv	WLK RM*	125	3.23	2	3	3	693	3.31	2	3	3
g1dv	WLK CORR*	125	3.45	2	3	3	693	3.57	2	3	3
g1ev	LOC UNIT	125	2.64	2	3	3	693	2.72	2	3	3
g1fv	LOC OFFU	125	3.54	2	3	4	693	3.46	2	3	4
g1gv	DRESS*	125	2.46	2	3	3	693	2.78	2	3	3
g1hv	EAT*	125	0.53	0	0	1	694	0.71	0	0	1
g1iv	TOLIET*	125	2.42	2	3	3	694	2.66	2	3	3
g1jv	HYGIENE*	125	2.40	2	3	3	693	2.62	2	3	3
g2v	BATH	125	2.82	3	3	3	693	3.05	3	3	3
ADLscore	Sum Above ADLs	125	27.96	20	29	34	693	29.80	22	30	36
ADLscore8	Sum of Indicated (*) ADLs	125	19.14	13	19	24	693	20.51	14	20	26

Table 19 ADL Levels at Long Stay NF Episode Initiation

TYPE OF NF STAY = LTC (>=4 MONTHS)											
		SCO Matched Cases N = 20					Matched Controls N = 196				
Individual and Cumulative ADL Scores											
Variable	**Description**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**	**N**	**Mean**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Asmtf	MDS Assessment = No	0	0.0%				4	2.0%			
Asmtf	MDS Assessment = Yes	20	100.0%				192	98.0%			
ADLs											
g1av	BED*	20	1.85	0	2	3	192	2.19	2	3	3
g1bv	TRANS*	20	2.45	2	2	3	192	2.52	2	3	3
g1cv	WLK RM*	20	2.80	2	3	3	192	3.44	2	3	3
g1dv	WLK CORR*	20	3.40	2	3	3	192	3.96	2	3	8
g1ev	LOC UNIT	20	3.00	2	3	3	192	2.79	2	3	4
g1fv	LOC OFFU	20	3.75	3	4	4	192	3.51	2	3	4
g1gv	DRESS*	20	2.45	2	3	3	192	2.95	3	3	4
g1hv	EAT*	20	0.70	0	0	1	192	0.85	0	0	1
g1iv	TOLIET*	20	2.35	2	3	3	192	2.71	2	3	3
g1jv	HYGIENE*	20	2.40	2	3	3	192	2.86	2	3	4
g2v	BATH	20	2.80	3	3	3	192	3.19	3	3	4
ADLscore	Sum Above ADLs	20	27.95	21.5	30.5	35.5	192	30.97	22	31	40
ADLscore8	Sum of Indicated (*) ADLs	20	18.95	13.5	20	25.5	192	21.32	14	21	29.5

The hypothesis tested in Tables 18-19 is that the SCO effect is to keep frail populations in the community longer. The impact of this effect is that those SCO enrollees who enter a nursing facility are frailer on average than the controls. The CY 2004 cohort analysis produced results that were consistent with this hypothesis. However the CY 2005 results do not demonstrate that SCO enrollees in nursing facilities are frailer on average. The new observation does not detract from the measurement of the SCO impact on nursing facility diversion/deferment.

Conclusion

The analysis of data from SCO enrollees and control subjects in CY2004-2005 provide an early glimpse of the effectiveness of the SCO program in reducing nursing facility utilization. The data is limited by the amount of follow-up time available. In the future data from CY 2007 will be used to extend the analyses. The new analyses will both increase the study population to include over 3,000 new CY 2006 SCO enrollees and their control counterparts. The extended analyses will increase the amount of follow-up time to close to three years for the CY 2004 cohort and 2 years for the CY 2005 enrollees.

The analyses of the data strongly indicate an SCO impact in reducing nursing facility use in both the first and second years of operation. The analysis of ADL levels among new nursing facility users suggests that the CY 2004 SCO population that does use facility care is frailer than the level seen in comparative non-SCO populations. The corollary that SCO financed community care is effective in maintaining more frail populations in the

community is supported by the CY 2004 year 1 and year 2 follow-up analyses. Further analyses examining the ADL score differentials employing a multivariate model are planned to clarify the impact of SCO care on the relationship between frailty level and length of stay.